

CLAIMS

1. Method for treating waste waters (E), and/or residue sludge (B) from the oxidation bath, to recover oxidation salts and carbonates, in at least one installation (10) for nitridation in a molten salt bath comprising a nitridation bath (11), an oxidation bath (12), and a stop bath (13), the treatment method comprising the following steps:

 - decarbonation of waste waters (E) and/or residue sludge (B) by precipitation of carbonate ions CO_3^{2-} ,
 - separation of a liquid phase containing oxidation salts (23) and of a solid phase containing a carbonate precipitate,
 - recovery, on the one hand, of oxidation salts and, on the other hand, of carbonates.

2. Method according to claim 1, wherein decarbonation is done by reaction between the carbonate ions CO_3^{2-} and the monovalent or divalent cations chosen from among: calcium ions Ca^{2+} (CaCO_3 precipitate), lithium Li^+ (Li_2CaO_3 precipitate), barium Ba^{2+} (BaCO_3 precipitate), magnesium Mg^{2+} (MgCO_3 precipitate), iron (II) Fe^{2+} (FeCO_3 precipitate), copper Cu^{2+} (CuCO_3 precipitate), manganese Mn^{2+} (MnCO_3 precipitate), cobalt Co^{2+} (CoCO_3 precipitate), or their mixtures.

3. Method according to claim 1, wherein decarbonation is done with hydroxides and/or alkaline and/or alkaline earth metal nitrates, in order to form carbonates of these alkaline and/or alkaline earth metals.

4. Method according to claim 1, wherein decarbonation is done with lime $\text{Ca}(\text{OH})_2$ and/or calcium nitrate $\text{Ca}(\text{NO}_3)_2$, to form calcium carbonate CaCO_3 , according to either of following respective reactions (1) and (2):

[Chem. 1]



[Chem. 2]



- 5 5. Method according to any one of the preceding claims, further comprising, before the precipitation step, a step of leaching the residue sludge (B), the precipitation being done in the leaching solution (14).
- 10 6. Method according to claim 5, wherein the leaching of the residue sludge (B) is done with the waste waters (E).
- 10 7. Method according to any one of the preceding claims, further comprising, before the decarbonation step, a step of separating metal particles or metal oxides present in the waste waters (E) and/or the residue sludge (B).
- 15 8. Method according to any one of the preceding claims, further comprising, after the step of separating the liquid phase and the solid phase, a step of separating water and oxidation salts (23) in the liquid phase, to recover the oxidation salts in solid form.
- 20 9. Method according to claim 8, further comprising, after separating water and oxidation salts (23), a step of recycling water to the stop bath (13) and/or at least one washing bath (6, 8).
- 25 10. Method according to any one of the preceding claims, further comprising, after the step of separating the liquid phase and the solid phase, a step of reinjecting oxidation salts (23) into the oxidation bath (12).